

1     Claims

2

3     1.   Apparatus for connecting to a subsea wellbore,  
4     the wellbore having a manifold and a choke body, the  
5     apparatus comprising:

6         a frame adapted to land on the manifold;

7         a conduit system having a first end for  
8     connection to the choke body and a second end for  
9     connection to a processing apparatus;

10        wherein the conduit system comprises a conduit  
11    means supported by the frame;

12        wherein the frame comprises at least one frame  
13    member that is adapted to land on the manifold in a  
14    first stage of the connection and wherein the  
15    conduit means is adapted to be brought into fluid  
16    communication with the choke body in a second stage  
17    of the connection.

18

19    2.   Apparatus as claimed in claim 1, further  
20    comprising an actuating means mounted on the frame,  
21    the actuating means being adapted to bring the  
22    conduit means into fluid communication with the  
23    choke body.

24

25    3.   Apparatus as claimed in claim 2, wherein the  
26    actuating means comprises at least one hydraulic  
27    cylinder.

28

29    4.   Apparatus as claimed in any preceding claim,  
30    wherein the conduit means comprises a flexible  
31    conduit.

32

1     5.   Apparatus as claimed in claim 4, wherein the  
2     flexible conduit is arranged to buffer the  
3     connection of the conduit means and the choke body.  
4

5     6.   Apparatus as claimed in claim 4 or claim 5  
6     wherein the flexible conduit has an end that is  
7     fixed relative to the frame and an opposite end that  
8     is moveable relative to the frame.  
9

10    7.   Apparatus as claimed in any of claims 4 to 6  
11    when dependent on claim 2, wherein the actuating  
12    means is adapted to move the movable end of the  
13    flexible conduit relative to the frame to bring it  
14    into fluid communication with the choke body.  
15

16    8.   Apparatus as claimed in claim 7, wherein the  
17    actuation means comprises at least one swivel device  
18    that allows movement of the end of the flexible  
19    conduit in more than one dimension.  
20

21    9.   Apparatus as claimed in any of claims 4 to 8,  
22    wherein the flexible conduit is resilient.  
23

24    10.   Apparatus as claimed in claim 9, wherein the  
25    flexible conduit is curved to provide resilience.  
26

27    11.   Apparatus as claimed in claim 10, wherein the  
28    direction of movement of the flexible conduit in the  
29    second stage of the connection defines an axis of  
30    connection and wherein the curvature is in a plane  
31    perpendicular to the axis of connection to provide  
32    resilience in the connection direction.

1

2 12. Apparatus as claimed in any of claims 4 to 11,  
3 wherein the conduit means comprises two flexible  
4 conduits.

5

6 13. Apparatus as claimed in claim 12, wherein each  
7 of the two conduits is fixed at a respective end  
8 thereof relative to the frame and wherein each of  
9 the two conduits has a respective opposite end that  
10 is moveable relative to the frame.

11

12 14. Apparatus as claimed in any preceding claim,  
13 wherein the conduit system further comprises a  
14 secondary conduit that is connected to the interior  
15 of the choke body and wherein the conduit means is  
16 adapted to connect to the secondary conduit in the  
17 second stage of the connection to connect the  
18 conduit means to the choke body via the secondary  
19 conduit.

20

21 15. Apparatus as claimed in claim 2 or claim 3,  
22 wherein the frame comprises a lower frame member and  
23 an upper frame member, the conduit means being  
24 mounted on the upper frame member, and wherein the  
25 actuating means is mounted between the lower and  
26 upper frame members and is adapted to move the upper  
27 frame member relative to the lower frame member to  
28 bring the conduit means into fluid communication  
29 with the choke body.

30

1 16. Apparatus as claimed in claim 15, wherein the  
2 actuating means is adapted to buffer the connection  
3 between the conduit means and the choke body.  
4

5 17. Apparatus as claimed in claim 1, wherein the at  
6 least one frame member of the first connection stage  
7 comprises a lower frame member, and wherein the  
8 apparatus further comprises an upper frame member,  
9 the upper frame member and the lower frame member  
10 having co-operating engagement means for landing the  
11 upper frame member on the lower frame member.  
12

13 18. Apparatus as claimed in claim 17, further  
14 comprising buffering means provided on the frame,  
15 the buffering means defining a minimum distance  
16 between the frame and the tree.  
17

18 19. Apparatus as claimed in claim 18, wherein a  
19 further buffering means is provided between the  
20 lower and upper frame members to define a minimum  
21 distance between the lower and upper frame members.  
22

23 20. Apparatus as claimed in claim 18 or 19, wherein  
24 the buffering means comprises adjustable stops.  
25

26 21. Apparatus as claimed in claim 20, wherein the  
27 buffering means comprises threaded bolts.  
28

29 22. Apparatus as claimed in any of claims 17 to 21,  
30 wherein the conduit system comprises a secondary  
31 conduit that is connected to the choke body and  
32 wherein the conduit means is adapted to connect to

1 the secondary conduit in the second stage of the  
2 connection to connect the conduit means to the choke  
3 body via the secondary conduit.

4  
5 23. Apparatus as claimed in claim 22, wherein the  
6 secondary conduit is supported on the lower frame  
7 member.

8  
9 24. Apparatus as claimed in any preceding claim,  
10 wherein the conduit system provides a single  
11 flowpath between the choke body and the processing  
12 apparatus.

13  
14 25. Apparatus as claimed in any of claims 1 to 23,  
15 wherein the conduit system provides a first flowpath  
16 from the choke body to the processing apparatus and  
17 a second flowpath from the processing apparatus to  
18 the choke body.

19  
20 26. Apparatus as claimed in claim 25, wherein the  
21 conduit system comprises a housing and an inner  
22 hollow cylindrical member, the inner cylindrical  
23 member being adapted to seal within the choke body  
24 to define a first flow region through the bore of  
25 the cylindrical member and a second separate flow  
26 region in the annulus between the cylindrical member  
27 and the housing.

28  
29 27. Apparatus as claimed in claim 26, wherein the  
30 first and second flow regions are adapted to connect  
31 to a respective inlet and an outlet of the  
32 processing apparatus.

1

2 28. Apparatus as claimed in any preceding claim,  
3 wherein the processing apparatus is provided on the  
4 frame.

5

6 29. Apparatus as claimed in any of claims 1 to 27,  
7 wherein the processing apparatus is provided on a  
8 separate subsea structure.

9

10 30. Apparatus as claimed in any preceding claim,  
11 wherein the processing apparatus comprises at least  
12 one of: a pump; a process fluid turbine; injection  
13 apparatus; chemical injection apparatus; a fluid  
14 riser; measurement apparatus; temperature  
15 measurement apparatus; flow rate measurement  
16 apparatus; constitution measurement apparatus;  
17 consistency measurement apparatus; gas separation  
18 apparatus; water separation apparatus; solids  
19 separation apparatus; and hydrocarbon separation  
20 apparatus.

21

22 31. Apparatus as claimed in any preceding claim,  
23 wherein the frame includes guide means that co-  
24 operate with guide means provided on the manifold,  
25 to align the frame with the manifold.

26

27 32. Apparatus as claimed in any preceding claim,  
28 wherein a replacement choke is provided on the  
29 frame, the replacement choke being connectable to  
30 the conduit system.

31

1     33. A method of connecting a processing apparatus  
2     to a subsea wellbore, the wellbore having a manifold  
3     and a choke body, the method comprising:

4         landing a frame on the manifold and connecting  
5     a conduit system between the choke body and the  
6     processing apparatus, the frame supporting a conduit  
7     means of the conduit system;

8         wherein the frame comprises at least one frame  
9     member that is landed on the manifold in a first  
10    connection stage, and wherein the conduit means is  
11    brought into fluid communication with the choke body  
12    in a second connection stage.

13

14    34. A method as claimed in claim 33, wherein  
15    actuating means are mounted on the frame, and  
16    wherein the method includes the step of actuating  
17    the actuating means to bring the conduit means into  
18    fluid communication with the choke body.

19

20    35. A method as claimed in claim 34, wherein the  
21    conduit means comprises a flexible conduit, one end  
22    of which is moveable relative to the frame, and  
23    wherein the method includes actuating the actuating  
24    means to move the end of the flexible portion  
25    relative to the frame to bring it into fluid  
26    communication with the choke body.

27

28    36. A method as claimed in any of claims 33 to 35,  
29    wherein the conduit system further comprises a  
30    secondary conduit that is connected to the choke  
31    body and wherein the method includes the step of

1 connecting the conduit means to the secondary  
2 conduit in the second stage of the connection.

3

4 37. A method as claimed in claim 33 or claim 34,  
5 wherein the frame comprises a lower frame member and  
6 an upper frame member, the conduit means being  
7 supported on the upper frame member, wherein the  
8 actuating means is mounted between the lower and  
9 upper frame members, and wherein the method includes  
10 the step of actuating the actuation means to move  
11 the upper frame member relative to the lower frame  
12 member to bring the conduit means into fluid  
13 communication with the choke body.

14

15 38. A method as claimed in claim 33, wherein the at  
16 least one frame member of the first connection stage  
17 comprises a lower frame member, and wherein the  
18 apparatus further comprises an upper frame member,  
19 and wherein the method includes the step of landing  
20 the upper frame member on the lower frame member.

21

22 39. A method as claimed in claim 38, further  
23 including the step of buffering the connection  
24 between the choke body and the conduit means.

25

26 40. A method as claimed in claim 39, wherein stop  
27 means are provided on the lower frame member, and  
28 the connection is buffered by adjusting the stop  
29 means to define a minimum distance between the  
30 manifold and the lower frame member.

31



1     41. A method as claimed in claim 39 or claim 40,  
2     including the further step of buffering the  
3     connection between the lower and upper frame members  
4     by providing stop means between the lower and upper  
5     frame members, the connection being buffered by  
6     adjusting the stop means to define a minimum  
7     distance between the upper and the lower frame  
8     members.

9  
10    42. A method as claimed in any of claims 38 to 41,  
11    wherein the conduit system comprises a secondary  
12    conduit that is connected to the choke body and  
13    wherein the method includes the step of connecting  
14    the conduit means to the secondary conduit in the  
15    second stage of the connection.

16  
17    43. A method as claimed in claim 42, wherein the  
18    method includes the initial steps of removing the  
19    choke bonnet and connecting the secondary conduit to  
20    interior of the choke body.

21  
22    44. A method as claimed in claim 43, wherein the  
23    choke bonnet is removed and the secondary conduit is  
24    installed by choke bonnet changing equipment.

25  
26    45. A method as claimed in claim 43, wherein the  
27    secondary conduit is supported on the lower frame  
28    member.

29  
30    46. A method as claimed in any of claims 33 to 45,  
31    wherein the conduit system provides a first flowpath  
32    from the choke body to the processing apparatus and

1 a second flowpath from the processing apparatus to  
2 the choke body and wherein the method includes the  
3 step of connecting the first and second flow regions  
4 to a respective inlet and an outlet of the  
5 processing apparatus.

6  
7 47. A method as claimed in any of claims 33 to 46,  
8 wherein the processing apparatus is provided on the  
9 frame, and wherein the method includes the step of  
10 connecting the conduit means to the processing  
11 apparatus before landing the frame on the manifold.

12  
13 48. A method as claimed in any of claims 33 to 46,  
14 wherein the processing apparatus is provided on a  
15 separate subsea structure and the method includes  
16 the step of connecting the conduit means to the  
17 processing apparatus after landing the frame on the  
18 manifold.

19  
20 49. A method as claimed in any of claims 33 to 48,  
21 wherein the method includes the step of connecting a  
22 replacement choke with the conduit system so that  
23 fluids flowing through the conduit system also flow  
24 through the replacement choke.

25  
26 50. Apparatus for connecting to a subsea wellbore,  
27 the wellbore having a manifold and a choke body, the  
28 apparatus comprising:

29 a frame having a conduit system, the frame  
30 being adapted to land on the tree, the conduit  
31 system including a first end which is adapted to  
32 connect to the choke body such that the conduit is

1 in fluid communication with the interior of the  
2 choke body, and a second end connectable to a  
3 processing apparatus;

4 wherein the frame comprises buffering means  
5 adapted to buffer the connection between the first  
6 end of the conduit system and the choke body.

7

8 51. Apparatus for connecting to a subsea wellbore,  
9 the wellbore having a manifold and a choke body, the  
10 apparatus comprising:

11 a frame adapted to land on the manifold;

12 a conduit system having a first end for  
13 connection to the choke body and a second end for  
14 connection to a processing apparatus;

15 wherein at least a part of the conduit system  
16 is supported by the frame;

17 wherein the conduit system comprises at least  
18 one flexible conduit having an end that is moveable  
19 relative to the frame to make up a communication  
20 between the processing apparatus and the choke body.

21

22